

Changing What's Possible



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As we look back over the past fiscal year – indeed, over the first decade of the new century – we see achievements that weren't even being discussed only a few short years ago. The face of our campus is in constant change, our research funding continues to grow in spite of increased competition and our academic offerings remain on the cutting edge.

The university has embarked on a new strategic plan which we think will position us favorably among the nation's top-tier academic health science centers as we plot our course

during this new decade. Specifically, we are intensifying our efforts in the areas of entrepreneurialism, technology and innovation, globalization and interprofessional-interdisciplinary collaboration. We are recruiting world-class scientists and clinicians to expand our already strong research and health-care efforts. Technological advancements enable us to treat patients miles away from our campus. As our research programs bring results, we can transform those results into increased economic activity through startup biomedical businesses.

This program will not be without its challenges, however. South Carolina and the nation remain mired in a weak – although improving – economy. State appropriations have decreased, but, fortunately, we learned a long time ago to be innovative in finding sources of revenue, and this we will continue

to do. In fact, if there's any silver lining in these tough times, it's the resourcefulness our administration, faculty, staff and students display in advancing MUSC's mission to serve the citizens of South Carolina.

Changing what's possible is the theme of our current communications campaign, and in this publication you will find we are making progress all over campus. Imagine altering the immune systems of organ transplant recipients to reduce the risk of rejection. Is it possible? That's one of the areas scientists are studying. Dental procedures that used to take weeks to complete now take only hours. Is it possible? It's already happening here. Helping victims of stroke or spinal cord injuries walk again – can it be done? We are on the leading edge of research in this field.

I am proud to be a part of this institution as it strives to improve the human condition. I invite you to learn more about MUSC through this and other publications, and through our website. Changing what's possible? Let's talk about changing what's IMpossible.

Sincerely,

Thomas L. Stephenson  
*Chairman, Board of Trustees*



Changing what's possible – it's a catchy expression, but what does it really mean? For me, it means that the Medical University is leading the way to a better tomorrow. Our faculty members, staff and students are pushing back the limits of today's realities in order to make the world healthier and happier. Changing what's possible can be found in virtually everything that we do.

Changing what's possible is Dr. Peter Tuerk in Psychiatry not accepting that combat experience can leave veterans with wounded psyches. So,

Dr. Tuerk developed award-winning treatments for post-traumatic stress disorder.

Changing what's possible is Dr. Mike Schmidt in Microbiology and Immunology not accepting that infections can complicate many hospitalizations. So, Dr. Schmidt demonstrated that copper surfaces on commonly touched hospital surfaces can reduce the spread of bacteria.

Changing what's possible is Dr. Frank Treiber in the College of Nursing not accepting that patients cannot control chronic illnesses. So, Dr. Treiber is developing innovative technologies to help prevent and manage these conditions.

Changing what's possible is Drs. Robert Adams in Neurosciences, Hugh Myrick in Psychiatry, Donna Johnson in Obstetrics and Gynecology, Dee Ford in Pulmonary Medicine and Samir

Fakhry in Surgery not accepting that rural residents cannot have access to state of the art care. So, these faculty members and their colleagues developed telemedicine efforts to reach out to rural hospitals and clinics.

Changing what's possible is Drs. Gary Gilkeson and Rick Silver in Rheumatology not accepting that patients with autoimmune connective tissue diseases should be constrained by current treatments. So, they are partnering with colleagues in China to test new stem cell therapies.

Changing what's possible is Drs. Cindy Swenson in Psychiatry and Eve Spratt in Pediatrics not accepting that AIDS should kill so many people in Africa. So, they partnered with colleagues in the Clemson architecture school to design and build a community health center in Ghana.

These are just a few of the people at the Medical University who are changing what's possible. The truth of the matter is that every one of our faculty, staff and students is involved in changing what's possible. Each has their own unique and important contribution to make and together, they truly are changing what's possible.

Raymond S. Greenberg, M.D., Ph.D.  
*President*



The ninth annual “Outstanding Teacher Of The Year “ award was won by Dr. Craig Beeson. Dr. Beeson has now won the award four times and most notably the last three years. The eleven nominees for the outstanding teacher of the year for the core curriculum were: Drs. Craig Beeson, Joe Blumer, Sherine Chan, Chris Davies, Scott Eblen, Yi-Te Hsu, Yiannis Koutalos, David Kurtz, Paul McDermott, Carola Neumann and Christina Voelkel-Johnson.

Awarded the tenth “Distinguished Graduate of the Year Award” —Juan Varela, MD, PhD; Mentor, Stephen Tomlinson, PhD.

Linnea Freeman, neuroscience graduate student, received the very prestigious MUSC Student Leadership Award.

Ryan Rhome, MD/PhD student, received the very prestigious Earl B. Higgins, Student Leadership Award in Diversity.

The Graduate Student Association once again was awarded the MUSC Gives Back Award.

A memorandum of understanding was signed by Dr. Greenberg, Dr. Moses Li and Dr. Jianhong Luo, executive dean, Zhejiang University School of Medicine for the exchange of PhD and MD/PhD students. A second memorandum of understanding was signed specifically for the development of a bi-institutional MD/PhD program with Zhejiang University School of Medicine.

From the time she was six, Leslie Wooten-Blanks knew she wanted to be a teacher. Then again, she had two good role models in her parents, whom she watched as they pursued their degrees at the University of Alabama, both earning doctorates in education. In fact, her mother went on to earn international recognition for her work in teaching learning-disabled students.

“By the time I was 8 or 9, I had grown tired of the children’s books in the library and ventured out of the children’s section to read some of the college level science textbooks,” she explains. “Of course, I didn’t understand all that was in them but I knew that I had discovered a love for both science and learning.”

Heather Davidson took a different path. As a graduate student at the Medical University of South Carolina, she taught classes on campus and at surrounding institutions for additional income. “At first, I needed the money,” she says, “but as I continued to teach, I realized how much I liked it so I wanted to work on my teaching skills to go along with my research training.”

Both are said to be naturals in the classroom, which may help explain why they excelled as scholars in the Institutional Research and Academic Career Development Award (IRACDA) program, a cooperative effort between MUSC and Claflin University in Orangeburg. The program offers postdoctoral researchers an opportunity to have a mentored teaching experience along with their investigative work. A similar program, the Postdoctoral Academic Career Development program, gives postdocs from Clemson, the University of South Carolina and MUSC the opportunity to teach at a number of academic institutions across the state.

Ed Krug, Ph.D., assistant dean of postdoctoral affairs in the College of Graduate Studies, directs the PACD program while Cynthia Wright, CGS associate dean for admissions and career development, is the program director for IRACDA. Although teaching is a basic and essential component of the two programs, Krug says, neither is designed to produce teachers per se.

What Krug hopes to see, among other things, is improved communication at all levels – students talking to other students and family and professionals exchanging information with other professionals about science.

“If we can get students talking to other students about a class they had, or a lab – if they’re doing more talking about being a scientist, and especially in South Carolina ... if we can get more of the diverse population of students to talk to their parents about what it’s like to be a scientist, we really stand a much better chance of changing the (educational) climate in this state,” Krug says. “It’s something that



Leslie Wooten-Blanks

“As far as my postdoctoral appointment and teaching goes, I found that the IRACDA program was instrumental in my getting a faculty position here at Claflin University.”

—Leslie Wooten-Blanks, Ph.D.,  
Claflin University assistant professor

I always ask, 'How often do you talk to your parents about your course work, specifically about your science courses?' And we anticipate that students who have a PACD or an IRACDA postdoc interacting with them will be more likely to do that. I think having a more science-aware populace is as valuable as having people who actually pursue a career in science."

For the postdocs, there are other tangible benefits besides honing teaching skills. "How do you interview for a job? How do you design a course? How do you balance research and teaching? It's all about time management. It's about being a professional, and none of the other programs that are out there do this," he says. "It really is about career

"(IRACDA) teaches you about grant writing, how to run a lab, how to manage a budget. These are valuable lessons that you don't get anywhere else."

—**Heather Davidson, Ph.D., MUSC research assistant professor**

development. Teaching is the tool, teaching is the vehicle for acquiring skills that promote career success at all levels. Teaching is about effective communication and this is what the postdocs are learning, to be a better communicator. If they can teach an undergraduate course to incoming freshmen, and get them to be excited about science, the chance of them writing a grant that gets a reviewer excited is much greater."

Davidson, now a research assistant professor in MUSC's Department of Neurosciences, supports Krug's assertion that the program teaches postdocs about life



*Heather Davidson*

"(IRACDA postdocs) are publishing at the same or better rate than other postdocs across campus, they're progressing on to getting jobs and having the same opportunities that other postdocs who don't participate in the program have."

— **Cynthia Wright, Ph.D., CGS associate dean for admissions and career development and IRACDA program director**



*Cynthia Wright*





*Ed Krug*

beyond the classroom. “It teaches you about grant writing, how to run a lab, how to manage a budget,” she says. “IRACDA gives you \$12,000 for you to develop your research. These are valuable lessons that you don’t get anywhere else.”

Wooten-Blanks is now on the Claflin faculty. “As far as my postdoctoral appointment and teaching goes, I found that the IRACDA program was instrumental in my getting a faculty position here at Claflin University,” she says. “As part of the program, I was introduced to the university and became familiar with the faculty and students. I taught biochemistry for the spring semester and was evaluated by the faculty member who mentored me. I attended faculty meetings and got to participate in them. This gave me insight into what being a faculty member entails that I had

not gotten as an adjunct.”

Teaching, of course, is a time- and labor-intensive endeavor. Postdocs’ primary obligations are research, writing for publication and getting jobs. Wright explains there was an initial concern that teaching postdocs would fall behind their researching colleagues, but a survey of all MUSC postdocs found little, if any, disparities. In fact, IRACDA and PACD postdocs surpassed those supported by more traditional mechanisms in grant writing and networking activity, two essential skills for any researcher.

“All the programs across the country who have IRACDA positions track their postdocs and how they are doing, and actually all of them have found that their postdocs are doing just fine in these programs,” Wright says. “They’re publishing at the same or better rate than other postdocs across campus, they’re progressing on to getting good jobs and having the same range of career opportunities that other

postdocs who don’t participate in the program have.”

Wright, Krug, Davidson and Wooten-Blanks all thought highly of the program, but its true success will have to be determined down the road when its impact can be fully measured. “In my perspective, it’s a 10- or 15-year timeline to really see what happens,” says Krug. “It will take that long to fully assess the impact of the programs on increasing diversity in the science professoriate, career satisfaction and accomplishments of the postdoctoral scholars, and resulting research collaborations between the institutions.”

If the program moves forward as expected, that will be 10 to 15 years of improved communication, more collaboration and, regardless of where the participants eventually wind up, a better understanding of the world around us.

“Teaching is about communicating and this is what people are learning, to be a better communicator. If they can teach an undergraduate course to incoming freshmen, and get them to be excited about something, the chance of them writing a grant that gets a reviewer excited is much greater.”

—Ed Krug, Ph.D., CGS assistant dean of postdoctoral affairs and PACD program director

## Transplant Center building a reputation on a national stage



*Prabhakar Baliga*

**D**r. Prabhakar Baliga has a story to tell about organ transplants, and it's a good one – about a medical institution with good outcomes, short waiting times and brief hospital stays. This institution is in a state that by most statistical data, ranks toward the bottom of all 50 states in many categories, including quality of life. This institution, however, compares very favorably to similar institutions in the Southeast and across the United States.

As medical director of the Transplant Center at the Medical University of South Carolina, Baliga understands his mission – apart from that as a skilled surgeon – is to preach the virtues of not only the Transplant Center's many successes, but also the advanced state of organ transplantation in general, some 57 years after it began.

"Of the 5,000 hospitals in the country, only 250 do transplants, and of the 250, only 125 do multi-organ transplants," he says. "By that definition, MUSC belongs to an elite club."

If you believe ancient Chinese folklore, organ transplants have been performed since 500 B.C. when, according to legend, a physician switched the hearts of two living patients (both of whom supposedly fully recovered).

Most of us, however, accept 1954 as the year the first successful major organ transplant occurred when a man donated a kidney to save his dying twin brother in Massachusetts. Fourteen years later, in South Carolina, the late Charles Thomas "Tommy" Fitts, M.D., performed the first organ transplant – a kidney – at MUSC. He is considered the father of transplant surgery in the state.

From that humble beginning, MUSC has become a regional and national leader

SCTR received funding and designation from NCRR under the Clinical and Translational Science Award in July 2009

Hollings Cancer Center received accreditation for comprehensive breast care program from the National Accreditation Program for Breast Centers

Establishment of a S.C. Center of Economic Excellence in Inflammation and Fibrosis Research

Gamma Knife services became available for patient care

In FY 2010, the College of Medicine received 1,111 awards for an overall extramural funding total of \$204.1 million

"Of the 5,000 hospitals in the country, only 250 do transplants, and of the 250, only 125 do multi-organ transplants. By that definition, MUSC belongs to an elite club."

**—Prabhakar Baliga, M.D., director of MUSC's Transplant Center**



in multi-organ transplantation. It is the only such program in South Carolina, and ranks highly nationally in several important categories, such as survival rates, shortest hospital stays, and waiting times. Baliga is understandably proud of the center's achievements, but wants to take the program further and has a vision for doing it.

A major part of the challenge is to sway the public away from some misconceptions about transplants and educate all South Carolinians about the world-class clinical operation in their own backyard. Enlightening the public about organ donation has been a challenge from the outset. Fitts, an Ivy League graduate who wore cowboy boots and listened to country music, was legendary in his relationships with his patients. He had a way of explaining the most complicated surgery in a way they could understand. Of course, as a pioneer in this novel medical procedure, he sometimes had no choice but to try and cajole his patients into following his advice. Once, when his staff had difficulty getting a patient to come to the hospital in the middle of the week for her new kidney, Fitts got her on the phone. "Dr. Fitts, can I come in and get it on Saturday?" the woman asked. "Honey," Fitts is said to have replied, "the kidney will be spoiled by then." The surgery commenced shortly thereafter.

According to statistics from the United Network for Organ Sharing (UNOS), more than 110,000 people are on waiting lists for organs. Of those, more than 87,000 need a kidney, far ahead of the next closest group, 16,000 in need of a liver. As things now stand, Baliga says, supply will never meet demand. But scientists are looking at ways to narrow the gap between the number of donors and recipients by targeting donor organs and the patients who receive them. They hope to do this not only by improving the health of the organ to be donated, but also by improving the immune system of the organ recipient.

"In terms of where we are today, we have programs that have incredible quality and high volume, and that's the foundation of what we do every day," Baliga says. "But where do we go from here? We have two or three things we'd like to do in terms of strategy. One is looking at ways to clinically grow the program, and put our best foot forward, that people recognize this program at a national level and attract patients that we can help even beyond the borders of South Carolina.

"The second step is looking at innovative treatments, and in transplant it works on several aspects. We look at ways to increase organ donations or the ability to get an organ. That ranges from steps we are taking to increase the number of available organs, or make organs that are not suitable for transplant more suitable," he says.

It seems almost beyond belief that biomedical science may be on the verge of rehabilitating organs within a living donor, to transform a liver with a high fat content, for example, to a leaner state through medication or other methods. But organ rehabilitation seems almost tame compared to an even more futuristic method of procurement: that of growing organs from human stem cells, an avenue which MUSC is actively investigating.

As successful as current transplant procedures are, however, the organ recipient still must take potent medications for the rest of his or her life to prevent rejection of the organ. These medications have their own baggage, sometimes leading to conditions ranging from diabetes to cancer. To eliminate – or at least minimize – this potential hazard, scientists are studying the possibility of "re-engineering" the body's immune system so it will accept a donor's organ as its own and not see it as a foreign substance.

Baliga won't go so far as to predict when or if such developments could happen, but says that one "major breakthrough" could change the transplant landscape dramatically, as the drug cyclosporine did in the mid 1980s.

"If you look at the history of transplants, from 1954 through 1984, the transplant success rate was in the range of 35 to 40 percent, and we only performed kidney transplants," Baliga explains. "Cyclosporine (an immunosuppressant drug introduced in 1983) took us from 35 to 40 percent to 75 to 80 percent. It doubled the success rate. It just required one drug to leap forward."

Most solid organ transplants now enjoy a one-year survival rate around 90 percent, Baliga says, due to improvements in post-operation procedures and medications.

Advancements in organ rehabilitation and recipient immune systems are noble goals, but remain beyond our immediate grasp. What Baliga would like to see are more altruistic donations like that of U.S. Marine Cpl. Ryan Fackey to Dani Jones last year (*see related article*). "We don't know how many people are out there who, given the knowledge of the safety of donating a kidney, may be willing to donate," he says. "There may be a larger group of people we can touch and educate, and be able to help people who are less fortunate with kidney failure."

Regardless of any future biomedical breakthroughs or an outpouring of organ donations, the transplant procedure is likely to remain a highly complicated long-term bond between the institution and the patient.

"It's a lifelong relationship and a lifelong commitment," Baliga says. "What I always tell my patients is, you're marrying MUSC."

## Dani and Ryan: the teenager and the Marine

**H**alf a world apart, Ryan Fackey and Dani Jones are closer than ever.

Fackey, a U.S. Marine corporal currently deployed in Afghanistan, donated one of his kidneys to Dani, a Columbia high school student who turned 17 this year. Before the surgical procedures brought them together in 2009, they had never met.

A native of Hamilton, Ohio, the 23-year-old Marine is known as a “Good Samaritan” donor, one who offers a kidney to any recipient in need. He was stationed at the Marine Corps Air Station Beaufort when he asked the Medical University of South Carolina to add him to the anonymous living donor list. He requested only that the kidney go to a recipient between the ages of 8 and 18.

Dani, an outgoing teenager, was suffering from kidney failure, the latest in a long line of medical problems stretching back to her toddler years when she was diagnosed with

“(Ryan) is her hero. They just bonded. I tell them, ‘You two are really brother and sister, you’ve got so much in common.’”

—Paula Wilson, Dani’s mother

myelofibrosis, a bone marrow disorder which prevents the normal production of blood cells.

When she was added to the kidney waiting list, she matched with Fackey. Dani wanted to meet her donor, and Fackey agreed.

The transplant was performed at MUSC on Wednesday, Nov. 11, 2009, Veteran’s Day. The marine and the high school



*Ryan Fackey and Dani Jones*

junior have been close ever since.

“I just thank God Ryan was available to give his kidney to her,” says Paula Wilson, Dani’s mother. “He is her hero. They just bonded. I tell them, ‘You two are really brother and sister, you’ve got so much in common.’”

Dani leads an active life, hiking, camping and engaging in several activities with other teenagers in a cancer support group. She is in the Girl Scouts, and, with her mother, participates in 5K walks. She volunteers for several support organizations.

At one time she thought about operating a nail salon when she got older. Now, her mother says, she’s considering becoming a phlebotomist because of her medical experiences.

During the Christmas holidays following the operation, Fackey had some time off but not enough time to visit his family in Ohio. Dani and her family invited him to spend the holidays with them, which he did. Dani’s family also helped him celebrate his birthday on Christmas Eve.

Last fall, Paula, Dani and her brother went to the South Carolina State Fair with Fackey and his mother, who came down from Ohio. While the mothers watched, the children hit the rides, especially getting after each other in the bumper cars. “All three of them were like big kids,” Paula says. “I’m just like, ‘I know you all are not acting like this.’ But they had a ball. It was wonderful.”

When Fackey was deployed to Afghanistan last November, Paula and Dani were there to see him off. They communicate constantly through Facebook and e-mail. And they plan to welcome him back home this summer.

After all, that’s what families do.



The dollar value of the external grants awarded to the College increased from \$2,632,248 to \$3,614,531 in 2010, a 37% increase in grant funding. This represents the highest funding received by CHP for research since records have been kept by the MUSC Office of Research and Sponsored Programs dating back to 1999.

In a recent survey, 98% of the students in CHP agreed with the statement, "I believe I have received a quality education at MUSC."

The College has been recognized for its outstanding faculty and excellence in teaching with nearly 40% of all the university-wide teaching awards since their inception presented to faculty in the College of Health Professions.

Graduates of our academic programs continue to exceed national averages on pass rates for national board exams. The average first time pass rate across all academic programs was 95% with no program lower than a 91% pass rate.

An interprofessional track for clinicians in the Doctor of Health Administration degree was approved by the South Carolina Higher Education Commission and will begin in the fall of 2011.

Students in the College of Health Professions donated over 6,000 hours of community service this year. Their outreach efforts touched the lives of those who live locally in the Charleston community and extended to children halfway around the world, living in Uganda.

The College of Health Professions continues to be viewed as a leader in interprofessional education with over 42 College of Health Professions students currently participating in the interprofessional fellowship experience.

## Neuro-rehab team seeks to get victims of stroke, spinal cord injuries back on their feet again

Take a step. Take another. Keep it up and you're engaged in our most fundamental form of motion – walking. What may seem like a simple activity involves several muscle groups, including the quadriceps and the calf muscles, and three major joints – hip, knee and ankle. During an average lifetime, a moderately active person could walk more than 100,000 miles.

For a person who has suffered a stroke or a spinal cord injury, however, the act of walking is anything but simple. He or she may greatly struggle with our most basic form of locomotion.

Steve Kautz, Ph.D., and his team are studying ways to return some of that mobility to sufferers of stroke or spinal cord injury.

Arriving at the College of Health Professions last July, they are conducting research in order to change rehabilitation following stroke or spinal cord injury. Their goal is give health care providers the means to customize rehabilitation treatment for the neurological deficits of each individual patient.

"We want to provide an appropriate stimulus to a person, to essentially allow them to practice walking in a way that is more recognized by their body," Kautz says. "You think about what happens after a stroke or spinal cord injury, people rely on walkers or crutches that change the simple mechanics of the way they walk and they become very inefficient and are at high risk of falling."

Kautz and his team could not have picked a better location for their research. South Carolina is among a group of states in the Southeast commonly referred to as the "stroke belt" due to the high incidence of the disease in comparison to the rest of the nation. "It's a huge problem here," admits Kautz. "I also have a VA appointment and over there (at the Ralph H. Johnson VA Medical Center) something like 75 percent of the admissions to their neurologic service are stroke-related."

The other aspect of the team's research – spinal cord injuries – also is gaining

"In the early 90s, there started to be more research into the plasticity of the nervous system that suggested that, even in the adult nervous system, there was more plasticity than we had given credit for. Now we know that the nervous system is capable of making changes."

—Steve Kautz, Ph.D.



*Patient Charles Cole (second from left) discusses his therapy with Aaron Embry, from left, Steve Kautz, Mark Bowden and Chris Gregory of CHP's neurological rehabilitation team.*

prominence due to the ongoing military conflicts in Iraq and Afghanistan. Tremendous advancements have been made in battlefield medicine in terms of saving lives, and that has carried over into civilian trauma care. "Compared to earlier wars, the casualty rate has been cut in half in terms of the number of people dying from their injuries, so that's leaving more with more severe injuries."

Before 1970, the idea of neurological rehabilitation was practically nonexistent since conventional wisdom held that the adult nervous system, once injured, couldn't adapt, according to Kautz. Continued research, however, brought new perspectives to the field.

"Beginning in the late 1980s, we began to realize it may be possible to teach people to walk again," he says. "In the early 90s, there started to be more research into the plasticity of the nervous system that suggested that, even in the adult nervous system, there was more plasticity than we had given credit for. Now we know that the nervous system is capable of making changes."

For medical science to understand those changes and use them to benefit the neurologically impaired, certain elements have to be present, and those elements are coming together at the Medical University. Kautz notes

the presence of the MUSC Stroke Center as a major factor in his research. "There's a big infrastructure in place and a commitment to stroke research," he says. The presence of the VA hospital is another major component, along with MUSC's collaboration with Clemson University in biomedical engineering research.

"We bring the rehab component," he says, and they bring it with sophisticated equipment that few institutions have. The labs will include a split-belt treadmill to measure 3-D ground reaction forces, high-tech video equipment to record a person's movement at up to 242 frames per second and a computer-controlled body-weight support system that assists someone walking on the treadmill or the floor.

"We have a very unique lab where we can do studies that not many people can do," he explains. "We're applying the latest science on how the nervous system changes after injury, and using that to guide our treatments of people to get the best outcomes. We have a good partnership between clinical scientists and engineers. There are some places that have really good engineers and some places that have really good researchers, but there aren't as many places that have both of them working together."



Completed a successful CCNE site visit and achieved a 10-year accreditation of the BSN and MSN programs with no recommendations

Achieved a 90% pass rate on the RN licensing exam for our 120 BSN graduates in 2009

Achieved a 100% pass rate for American Academy of Nurse Practitioners (AANP) certification exam for family nurse practitioner

Successfully recruited Dr. Frank Treiber as our second Endowed Chair for CoEE Technology Center to Enhance Healthful Lifestyles

Achieved 37% minority diversity for CON fall 2009 admissions. The total student minority diversity for CON enrollment was 13% in fall 2009. An additional 10% were males

Total funded grants increased by 50%

Funded research grants increased by 101%

## Nursing is changing the face of graduate education

*With one-third of the nursing workforce of retiring age and health care reform leaning to the nursing profession to meet primary care demands, the need for highly educated nurses is an understatement. This is the niche that the Medical University of South Carolina's (MUSC) College of Nursing (CON) has taken on as its mission.*

To prepare nursing students so they can successfully contribute to the health of our country's population and evolving health care policy, the CON offers two doctoral programs; the research-based Ph.D. program and the clinical Doctor of Nursing Practice (DNP). Both programs are offered entirely online and have either a Bachelor of Science or Masters of Science admission option, making them unique in the state and region. As the largest educator of doctorate-level nurses in the state, this fall the CON admitted approximately 100 of the best and brightest the state and nation had to offer. It received about 200 applications.

"The College of Nursing is graduating nurses prepared at the doctoral level, who will lead the way in providing care as nurse practitioners, improving the quality of care as advanced practice nurses and fueling the nursing workforce as future nursing faculty for the state, region and nation," says CON Dean Gail Stuart, Ph.D., R.N.

There are two points of entry into the DNP program, post baccalaureate degree and post master's degree, although Stuart encourages the former. "What we want to establish is a pipeline for a younger nursing work force with doctoral degrees, so they can contribute more to health care improvements over the life of their careers," Stuart says. The more flexible format of online education allows nurses to remain in the communities, working part time or full time while pursuing their advanced degree. "It makes learning fit into their lives," says Robin Bissinger, Ph.D., APRN, director of graduate programs. Online offerings have directly contributed to the outstanding retention and graduation rates of the college.

CON graduates are having a significant impact in the state as Ph.D. nurse scientists creating new knowledge through research and as DNP primary care practitioners, who translate and utilize the pioneering research created by the Ph.D. graduate. "The nurse scientists are the ones who work in academic institutions as faculty members, obtain grants for research and submit publications to peer-reviewed journals," says Gail Gilden, ScD, R.N., director of the Ph.D. program.



Gail Stuart, from left, Gail Gilden (via Skype), Robin Bissinger

“They are the ones building the body of knowledge in nursing science.” More nursing faculty means an increased capability for a larger number of nursing students, which in turn leads to more bedside nurses, nurse researchers, nurse educators and primary care nurse practitioners; all of whom will be in high demand in the next decade.

*Some examples of current research include the following:*

- Training school nurses to screen adolescents for depression
- Analyzing the relationship between dental health and cardiac outcomes
- Examining the risk factors of obesity in children
- Determining the benefits of feeding preterm babies breast milk
- Reviewing catheter protocols to decrease the occurrence of urinary track infections in hospitalized patients
- Identifying the needs of caretakers who care for people with Alzheimer’s disease

While the focus of the Ph.D. program is research, the crux of the DNP is clinical practice. Key topics in DNP coursework are patient safety, quality of improvement and translational research as students evaluate the effectiveness

“For South Carolina to get future grant funds, it is going to have to change (state policy) if they want to qualify for those federal dollars.”

—Gail Stuart, Ph.D., R.N., CON dean

and quality of care a patient receives. “It’s all about quality improvement or process improvement and learning how to change outcomes within a clinical practice or within a system,” Bissinger says. “We’re developing practitioners who know where to get information and how to translate it to give better care.” Graduates are then taking this knowledge of what should be incorporated into practice from reviewed research with them into the family medicine and pediatric settings of primary care.

The ability to lead a team and be active in health care policy is so important that these lessons permeate the graduate-level coursework. “Our graduates are superbly aligned with the rapidly changing environment, meeting

“We’re developing practitioners who know where to get information and how to translate it to give better care.”

—Robin Bissinger, Ph.D., RNC, CON  
director of graduate programs

the health care needs of today, and anticipating future trends,” stated Stuart. CON faculty mentor graduates to view nursing as a career and to become leaders in their profession, who are constantly striving to improve the system, provide better care and reduce costs.

New health care laws will require a different way of caring for patients, and the CON is prepared to tackle future challenges. “Reform is calling for independent practice, and nurses with their doctorate will work alongside all professionals,” Gilden says. South Carolina is one of the few remaining states where graduate degree nurses are restricted in practice by the mandated supervision of a primary care physician.

CON leaders agree there is much more work to be done in changing policy to allow nurses to practice independently. “We are preparing a vanguard of skilled and cost-effective nurse practitioners who can provide increased access to high quality care in our state,” noted Stuart.

“However, our current practice act prevents us from taking full advantage of this rich nursing resource. South Carolina must change these restrictive nursing practice provisions in order for us to be eligible for future federal grants. Most importantly, eliminating restrictions in the regulation of advanced nursing practice will be essential to providing everyone in South Carolina access to quality health care; the true goal of nurses.”

Behind an exceptional CON student is a stellar faculty accomplished in research or the clinical arena. CON faculty members are paving the way for future generations of nurses to make a difference in the health of patients, families and communities. Recruitment has become very selective, and there currently is a robust research office. Stuart believes the college could do even more, but have been significantly hampered by diminished state funding.

Stuart describes the college as a well-built engine. “We are tuned up and ready to go. All our spark plugs are firing, but an infusion of high test is needed to take us to the next level.” Nursing will be a major driver in health care reform and MUSC CON is revving their engines for the journey.



Recruited two internationally-known scholars as endowed chairs: in March, Dr. Charles Bennett was named Frank P. and Josie M. Fletcher Professor of Pharmacy and Endowed Chair of the Center for Medication Safety and Efficacy. In December, Dr. Patrick Woster was named Endowed Chair of the Centers for Economic Excellence in Drug Discovery.

The College was granted full accreditation by the Accreditation Council for Pharmacy Education (ACPE) in its June report.

In September the William P. and Lou W. Kennedy Pharmacy Innovation Center was launched with the announcement that it would be funded by a \$30 million gift from USC alumni Bill and Lou Kennedy, second largest in the history of USC.

Funding for a pharmacy building on the MUSC campus is gaining momentum – visit the new campaign website at [www.buildingthefutureofpharmacy.org](http://www.buildingthefutureofpharmacy.org) for more information.

The National Institutes of Health (NIH) continues to recognize the quality work of College of Pharmacy scientists. In 2010, the College ranked in the top five percent of Ph.D. faculty with NIH funding and the College's total NIH funding of \$7.5 million is ranked in the top 20 overall in the country.

More information can be found on the College's Web site: [www.sccp.sc.edu](http://www.sccp.sc.edu).

"If you eliminate the time, trouble and expense of an additional doctor's office visit, more people will get the flu vaccine."

—Wayne Weart, Pharm.D., professor of clinical pharmacy and outcomes science

## Pharmacies moving to frontlines of flu battle

In 2009, the H1N1 influenza pandemic reminded the country about the potential devastation the flu can bring. By the end of May, 2010, the World Health Organization's Global Alert Response weekly update reported "more than 214 countries and overseas territories or communities have reported laboratory confirmed cases of pandemic influenza H1N1 2009, including over 18,138 deaths."

Americans sweated dire predictions of millions of deaths, especially in light of limited initial supplies of vaccine. This discomfiting experience, however, produced one substantial long term benefit – an increased awareness of the benefits of flu vaccinations.

That awareness opened the door for clinical faculty in the South Carolina College of Pharmacy to change what is possible.

"We recognized an opportunity to have a potentially significant impact on immunization rates in South Carolina," says Wayne Weart, professor of clinical pharmacy and outcomes science and president and chairman of the board of the South Carolina Pharmacy Association (SCPhA). "If you eliminate the time, trouble and expense of an additional doctor's office visit, more people will get the flu vaccine."

Weart has been a staunch advocate of extending prescriptive authority to pharmacists for administering the flu vaccine. He chaired the SCPhA committee that pushed for the change and Rep. Kit Spires, who served on that committee, sponsored the legislation in the House. In June 2010, with the difficulties in distributing and administering the H1N1 vaccine fresh in mind, the South Carolina General Assembly passed an amendment enabling pharmacists under certain conditions to administer the vaccine.

James Sterrett, assistant professor of clinical pharmacy and outcomes sciences, was one of two pharmacists the South Carolina Board of Pharmacy picked to serve on the committee working with the Board of Medical Examiners to estab-



lish the protocol. The SCPhA's Jennifer Baker was the other pharmacist to serve on the committee.

All four are alumni of SCCP founding institutions: Weart (R '72) and Sterrett ('97) from MUSC and Spires

"When the swine flu pandemic hit in 2009, it was not possible for a South Carolinian to walk into the local pharmacy and get a vaccine shot without a prescription. Now it is possible."

—Philip Hall, Ph.D., MUSC campus dean of the South Carolina College of Pharmacy.



('76) and Baker ('02) from the University of South Carolina (USC).

On November 10, the Committee's recommendation was approved by the Board of Medical Examiners. Part of the protocol includes a pharmacist going through the American Pharmacy Association's Pharmacy-Based Immunization Delivery Training Program, followed by an annual continuing education requirement. Since the amendment passed, nearly 500 pharmacists have earned the certifications.

While the protocol calls for vaccine administration by a licensed pharmacist only – so SCCP student pharmacists cannot administer them during rotations – both SCCP campuses have required that all third-year students go through the certification process. So every year nearly 200 more immunization-certified pharmacists will be able to start administering immediately upon licensure.

South Carolina's immunization rate is low. According to surveys from the end of January 2010 cited by the U.S. Centers for Disease Control and Prevention (CDC), South Carolina's 37.2 percent joins the state with Alabama (35.6), Florida (31.6), Georgia (34.4), and Mississippi (35.1) as rating below the national average of 39.7.

The 2010-11 flu season represents an opportunity to change that. Interest is growing. According to data presented by the CDC's Gary Euler at the 2010 National Influenza Vaccine Summit last May in Scottsdale, Ari., the 2009-2010 season saw a 67-percent relative increase of seasonal vaccination among children and a 30-percent relative increase among healthy young adults, compared to the 2008-9 season.

If South Carolina is to continue this national trend, the flu vaccine needs to be as easily attainable as possible. For many people, that means having the convenience of a place

they already go a couple of times a month – their pharmacy – and the simplicity of a point-of-purchase decision to consult their pharmacist. One of the most common reasons people give for not getting immunized relate to fears of side effects and/or that the vaccine will cause the flu, so the reassurance of one of the nation's most trusted professionals (no. 3 in the 2010 Gallup poll released in December) could also help increase immunization rates.

Every state allows pharmacists to offer immunizations; requirements on prescription versus protocol vary. In either case, patients are taking advantage of it. According to the November 2010 Rapid Flu Survey, 20.3 percent of adults are vaccinated at pharmacies, supermarkets or other stores.

How much of an impact this easier access has on overall immunization rates remains to be seen. But it seems to be working in one important respect already. The South Carolina Department of Health and Environmental Control released a South Carolina Flu Watch report at the end of November that showed 383 positive rapid antigen tests identified to date during the 2010 flu season; at the same point in 2009, there were 18,000 more.

On October 1, at least partly in recognition of this important new service pharmacists provide, Charleston Mayor Joe Riley signed a proclamation declaring October as American Pharmacists Month.

"When the swine flu pandemic hit in 2009, it was not possible for a South Carolinian to walk into the local pharmacy and get a vaccine shot without a prescription," says Philip Hall, MUSC campus dean of the South Carolina College of Pharmacy. "Now it is possible. And that will make a lot of people healthier, which is ultimately why we're here."



New 118,000 sq ft clinical facility dedicated

Predoctoral class increased from 55 to 70 students

Simulation Support Laboratory opened

CAD/CAM Laboratory opened

Graduate Program in Endodontics initiated

## Dental Medicine curriculum prepares grads for both traditional and state-of-the-art procedures

**B**reakthroughs in health care mean more than saving lives; it means improving quality of life. Such is the case in the College of Dental Medicine, where James A. Rivers, D.M.D., M.H.S., and Walter Renne, D.M.D. teach and practice restorative dentistry.

Using CAD/CAM technology, dental medicine students learn how to make and fit crowns within a matter of hours instead of weeks. A patient can be examined and fitted with a permanent crown in one visit, rather than two or more. Any adult has probably experienced the addition of one or more crowns and the multiple trips to the dentist's office, especially if complications arise.

"We're on the cutting edge of what is possible and what's changing in dentistry," says Rivers, professor and chairman of the Department of Oral Rehabilitation.

Knowing how to use CAD/CAM (computer-assisted design/computer-assisted manufacturing) technology gives MUSC graduates an advantage in the job market. Renne, an assistant professor and MUSC graduate who directs the CAD/CAM course, says the new technology does not replace the traditional process of making a crown; rather, students learn both methods since the new technology is still making its way into dental practices.

There are no precise statistics on this, but MUSC may be the only institution in the nation making CAD/CAM a mandatory course for all dental students. They take it during their sophomore year. "We haven't really removed anything (from the curriculum)," Renne explains. "They still learn to do crowns the traditional way. It's a very, very important part of their curriculum."

"The students still need to learn to do standard crowns and fillings," Rivers says. "Everything that has to be done, they can do it."

MUSC dental graduates who continue on in residency or other postgraduate programs are more likely to be accepted due to the depth of their education and clinical experience, Rivers adds.

Using CAD/CAM technology, the dentist controls all facets of the preparation for and milling of a crown. The number of steps – and hands – in the process is greatly reduced. "Because the dentist has total control over the entire restoration process, they can do quality control themselves," Renne explains. "With the economy the way it is, sometimes restorations are being sent to foreign laboratories. By using this system, the dentist can ensure that everything is made here in the States and they have quality control over the entire process. There aren't multiple hands touching the crown before it gets back to the dentist and they know it's the best material they can have."

Currently, the E4D Dentist system and another system are the only ones

employing the CAD/CAM technology.

The college employs the E4D Dentist system by D4D Technologies based in Richardson, TX. MUSC obtained the system in 2009. It is one of two using the CAD/CAM technology. Of the approximately 150,000 practicing dentists in the United States, about 13 percent are using one of the two systems, but the number of converts increases annually, Renne says. In teaching the course, he focuses on the fundamentals of restoration rather than the intricacies of the software. "Perhaps the students go out and they don't have this system or they have a different system," he explains, "but what's always going to remain the same is how to do a proper tooth preparation."

In short, the E4D system takes a three-dimensional digital image of the tooth, sends it to a computer, which designs the crown and sends it to an on-premise milling unit to manufacture it. A student can do the entire process within

three hours, but an experienced practitioner probably can do it in half the time, Renne says.

Technology has not only improved the restoration process, but also the materials used in the process. "Modern advances in adhesive dentistry allow us to essentially glue the cusp onto the tooth, where before you had to shave the entire tooth to fit the crown," Renne says. "We're actually doing more conservative dentistry with this technology. We try to

just replace what's missing, rather than grinding on the tooth unnecessarily.

"The materials that we use with this system, not only are they durable, they're beautiful. They're absolutely lifelike. There's no metal showing through, there are no

gray lines anywhere. It's absolutely lifelike," Renne says.

"We've been dealing with porcelain many, many years in dentistry," Rivers adds. "The problem was getting something that was strong and looked good at the same time. Now, with the new porcelains, we have strength and beauty together."

*"We're on the cutting edge of what is possible and what's changing in dentistry."*

**James A. Rivers, DMD, MHS, professor and chairman of the Department of Oral Rehabilitation**

*Walter Renne, left, and James Rivers with the E4D systems.*





# MUSC ends year with record \$76.7 million in donations

*Endowment posts 25 percent gain; capital campaign surpasses goal one year ahead of schedule*

Philanthropic contributions to the Medical University of South Carolina grew to a record \$76.7 million during fiscal 2010, despite adverse economic conditions and a national decline in giving to nonprofits.

The 8.2 percent increase in giving to MUSC took place during a year when overall giving to nonprofits nationwide declined 3.2 percent, according to a report published by the Giving USA Foundation in June.

The year's contributions pushed the Medical University well beyond the goal of its \$300 million Partnership of Promise capital campaign, which it publicly launched in May of 2008. As a result, the campaign came to a successful close a full year ahead of schedule and nearly 20 percent over its dollar goal.

University President Ray Greenberg said that the campaign's success was especially notable in that it took place in spite of such adverse economic conditions.

"When we launched our capital campaign, we felt \$300 million was an ambitious but achievable goal. Of course, at the time, none of us could have anticipated the economic downturn that would take place in the midst of that effort," said Greenberg. "But nor could we have foreseen the incredible outpouring of support that would follow. There's no way we could ever adequately thank people for that."

Between July 1, 2004 and June 30, 2010, more than 37,000 people, businesses and organizations made nearly \$355 million in gifts and pledges to the Partnership of Promise campaign.

These funds will enable the university to establish endowed chairs, build new facilities, provide scholarships and support programs that otherwise wouldn't be possible under its current economic circumstances. All of these assets will

place the university in a much stronger position to recruit and retain the best faculty and students in the country, thereby "raising all boats" at the university, said Greenberg.

"The Medical University is driven by the talent and dedication of the people who are here. So our goal is to recruit the most outstanding individuals we can find anywhere in the world and bring them to South Carolina," said Greenberg. "Whether you're talking about an endowed chair or a new research facility paid for with private dollars, all of these

things are enticements in this very competitive marketplace that we're in for the best talent. That, more than anything else, is what private philanthropy drives."

While Greenberg was pleased with having exceeded the campaign's financial goal, he said the true measure of its success defies quantification.

"In the final analysis, this campaign wasn't about achieving a certain dollar figure. What it was really about was serving the population of students we educate and patients we care for. In that sense, there's no way to effectively measure the full extent of the campaign's success. Its impact is literally infinite because it will affect people's lives in ways that we can only begin to guess, not just today but from this day forward."

Also during fiscal 2010, the MUSC Foundation achieved a gain of almost 14 percent in its overall investment portfolio and nearly 25 percent in the value of its charitable endowment, which grew to \$181.6 million.

At the end of the year, the value of the foundation's total assets stood at approximately \$346 million, about 16 percent more than the previous year's ending balance. These funds are used to support approximately 1,200 academic, research and patient-care programs at the Medical University.

"The Medical University is driven by the talent and dedication of the people who are here. So our goal is to recruit the most outstanding individuals we can find anywhere in the world and bring them to South Carolina."

**Ray Greenberg, M.D., Ph.D., President**





*On November 5, 2010, more than 200 friends and supporters gathered at Charleston Place Hotel to celebrate the successful conclusion of the Partnership of Promise Campaign, which resulted in approximately \$355 million in gifts and pledges.*





## REVENUES

### UNIVERSITY

State Appropriations	\$ 130.7
Grants, Gifts, Contracts	226.9
Sales and Services	132.1
Tuition and Fees	62.5
Other	24.3

### MEDICAL UNIVERSITY HOSPITAL AUTHORITY

Patient Services	980.1
Other	19.1

### UNIVERSITY MEDICAL ASSOCIATES

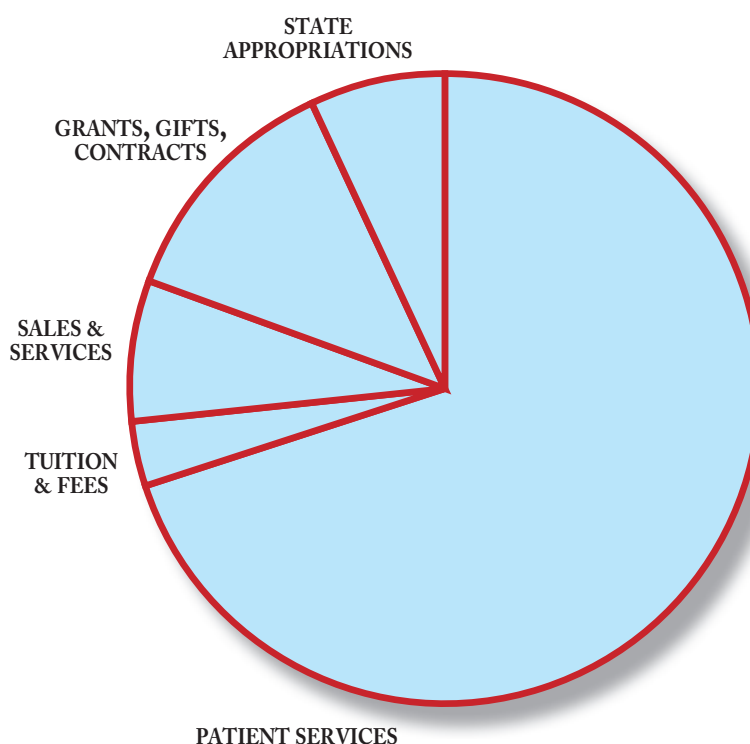
Patient Services	293.8
Other	27.1

### NONMAJOR ENTERPRISE FUNDS

1.9

**TOTAL \$1,898.5**

FISCAL YEAR ENDING JUNE 30, 2010 FISCAL YEAR ENDING JUNE 30, 2010 FISCAL YEAR ENDING JUNE 30, 2010



## EXPENSES & TRANSFERS

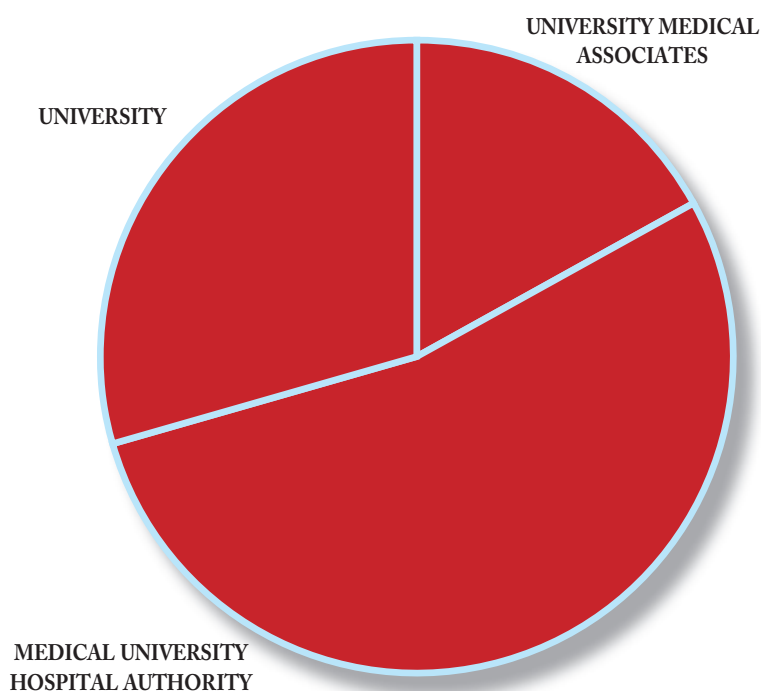
University	512.6
Medical University Hospital Authority	935.4
University Medical Associates	292.7
Nonmajor Enterprise Funds	1.6

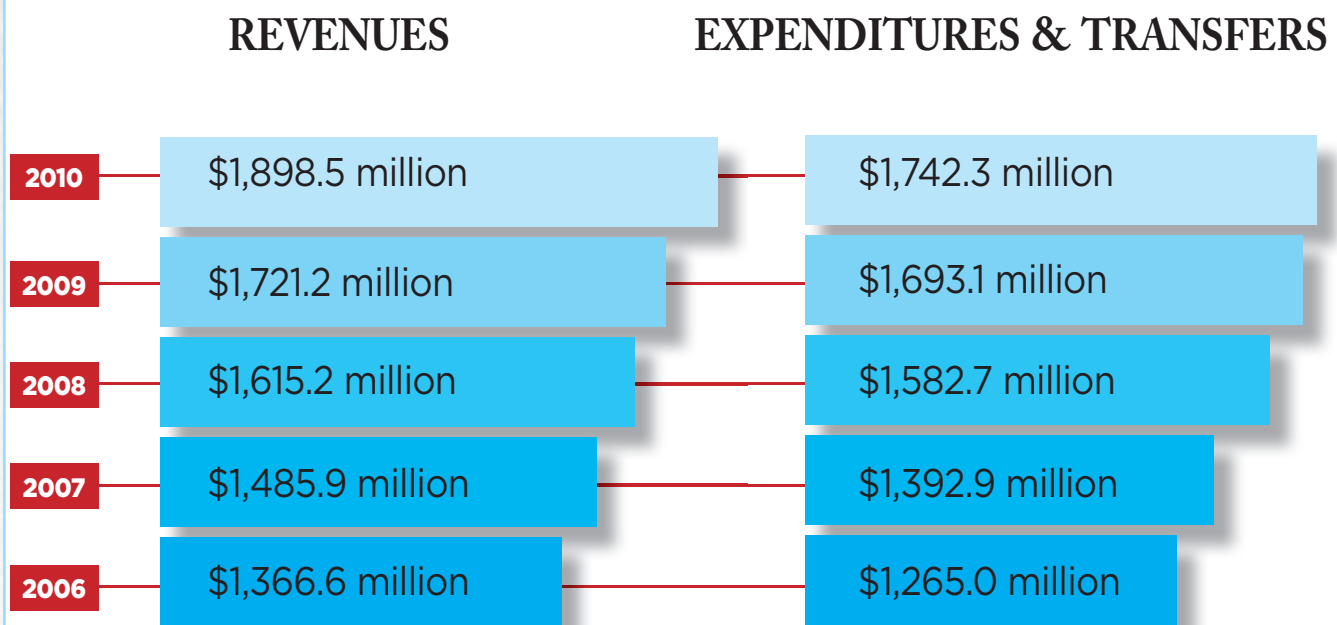
**TOTAL \$1,742.3**

**INCREASE IN NET ASSETS \$156.2**

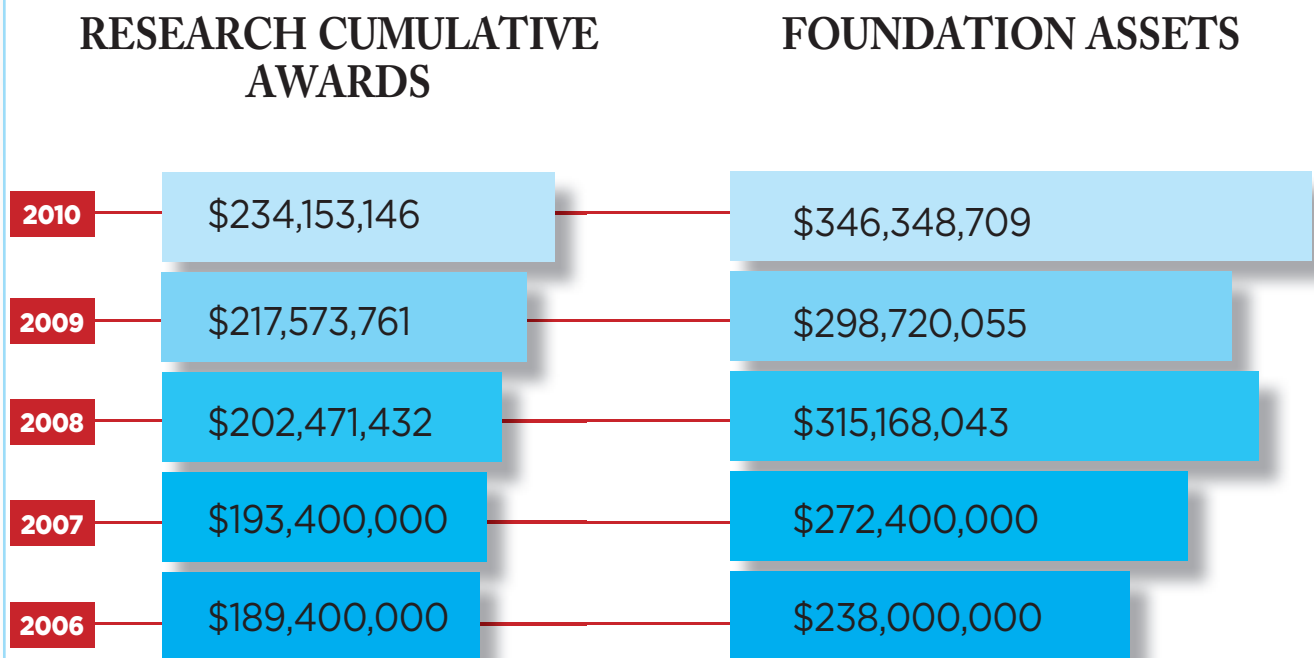
*Note: The Nonmajor Enterprise Funds are comprised of the Medical University Facilities Corporation and CHS Development Company.  
Source: Audited Financial Statements for the year ended June 30, 2010.*

MILLIONS OF DOLLARS MILLIONS OF DOLLARS MILLIONS OF DOLLARS





OF DOLLARS MILLIONS OF DOLLARS MILLIONS OF DOLLARS MILLIONS OF DOLLARS





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